

**WHAT IS CLAIMED IS:**

1. An electron gun for a cathode ray tube comprising:
  - a cathode for emitting thermal electrons;
  - a first electrode adjacent the cathode;
  - 5 a second electrode adjacent the first electrode to receive a screen voltage and control the emission of thermal electrons from the cathode;
  - a third electrode adjacent the second electrode;
  - a fourth electrode adjacent the third electrode to receive a focus voltage; and
- 10 a fifth electrode partially surrounding the fourth electrode while being adjacent the fourth electrode to receive an anode voltage together with the third electrode;
  - wherein the second electrode has a bottom portion with a stepped portion surrounding a hole for guiding the electron beams while being protruded toward the first electrode, and a sidewall portion extended from the periphery of the bottom portion toward the third electrode;
  - 15 wherein the first electrode and the second electrode are structured to satisfy the following condition:

$$0.54 \leq T/G \leq 1.50$$

- 20 T(mm) indicating the thickness of the bottom portion of the second electrode, and G(mm) indicating the distance between the first and the second electrodes.

2. The electron gun of claim 1, wherein the second electrode is structured to satisfy the following condition:

$$0.15 \leq T(mm) \leq 0.3$$

T(mm) indicating the thickness of the bottom portion of the second electrode.

3. The electron gun of claim 1, wherein the first and the second electrodes are structured to satisfy the following condition:

$$0.20 \leq G(\text{mm}) \leq 0.28$$

5 G(mm) indicating the distance between the first and the second electrodes.

4. The electron gun of claim 1, wherein the cut-off voltage (V) is established to satisfy the following condition:

$$V = k \frac{\phi(G1) \times \phi(G3)}{g(G1 \cdot G2) \times g(K \cdot G1) \times tG1 \times 2^{tG2}} \times Ec2 \times Eb$$

k indicating a constant,  $\phi(G1)$  indicating the diameter of the beam-guide hole of

10 the first electrode,  $\phi(G3)$  indicating the diameter of the beam-guide hole of the third electrode,  $g(G1 \cdot G2)$  indicating the distance between the first and the second electrodes,  $g(K \cdot G1)$  indicating the distance between the cathode and the first electrode,  $tG1$  indicating the thickness of the first electrode,  $tG2$  indicating the thickness of the bottom portion of the second electrode,  $Ec2$  indicating the screen voltage applied to the second electrode, and  $Eb$  indicating the anode voltage applied to the third electrode.

15 5. The electron gun of claim 1, wherein the bottom portion and the stepped portion of the second electrode are circular-shaped.

20 6. The electron gun of claim 5, wherein the second electrode is structured to satisfy the following condition:

$$0.08 \leq D1/D2 \leq 0.30$$

D1(mm) indicating the diameter of the stepped portion of the second electrode, and D2(mm) indicating the diameter of the bottom portion of the second

electrode.

7. The electron gun of claim 5, wherein the second electrode is structured to satisfy the following condition:

$$1.0 \leq D1(\text{mm}) \leq 3.0$$

5 D1(mm) indicating the diameter of the stepped portion of the second electrode.

8. The electron gun of claim 1, wherein the second electrode is structured to satisfy the following condition:

$$0.02 \leq H1/H2 \leq 0.17$$

H1(mm) indicating the height of the stepped portion of the second electrode,

10 and H2(mm) indicating the height of the sidewall portion of the second electrode.

9. The electron gun of claim 1, wherein the second electrode is structured to satisfy the following condition:

$$0.05 \leq H1(\text{mm}) \leq 0.30$$

15 H1(mm) indicating the height of the stepped portion of the second electrode.

10. The electron gun of claim 1, wherein the stepped portion of the second electrode is non-circular shaped.

11. The electron gun of claim 10, wherein the stepped portion is rectangular-shaped with a long side proceeding in the vertical direction of the screen, and a short side proceeding in the horizontal direction.

20 12. The electron gun of claim 10, wherein the stepped portion is rectangular-shaped with a long side proceeding in the horizontal direction of the screen, and a short side proceeding in the vertical direction.

13. The electron gun of claim 10, wherein the stepped portion is oval-

shaped with a long side proceeding in the vertical direction of the screen, and a short side proceeding in the horizontal direction.

14. The electron gun of claim 10, wherein the stepped portion is oval-shaped with a long side proceeding in the horizontal direction of the screen, and a short side proceeding in the vertical direction.

- 5           15. An electron gun for a cathode ray tube comprising:
- a cathode for emitting thermal electrons;
  - a first electrode adjacent the cathode;
  - a second electrode adjacent the first electrode to receive a screen
  - 10 voltage and control the emission of thermal electrons from the cathode;
  - a third electrode adjacent the second electrode;
  - a fourth electrode adjacent the third electrode to receive a focus voltage; and
  - a fifth electrode partially surrounding the fourth electrode while being
  - 15 adjacent the fourth electrode to receive an anode voltage together with the third electrode;
- wherein the second electrode has a bottom portion with a stepped portion surrounding a hole for guiding the electron beams while protruding toward the first electrode, and a sidewall portion extended from the periphery of
- 20 the bottom portion toward the third electrode;

wherein the first and the second electrodes are structured to satisfy the following condition:

$$0.15 \leq T(\text{mm}) \leq 0.3, 0.20 \leq G(\text{mm}) \leq 0.28$$

T(mm) indicating the thickness of the bottom portion of the second electrode,

and G(mm) indicating the distance between the first and the second electrodes.

16. The electron gun of claim 15, wherein the bottom portion and the stepped portion of the second electrode are circular-shaped.

17. The electron gun of claim 16, wherein the second electrode is structured to satisfy the following condition:

$$0.08 \leq D1/D2 \leq 0.30$$

D1(mm) indicating the diameter of the stepped portion of the second electrode, and D2(mm) indicating the diameter of the bottom portion of the second electrode.

18. The electron gun of claim 16, wherein the second electrode is structured to satisfy the following condition:

$$1.0 \leq D1(mm) \leq 3.0$$

D1(mm) indicating the diameter of the stepped portion of the second electrode.

19. The electron gun of claim 15, wherein the second electrode is structured to satisfy the following condition:

$$0.02 \leq H1/H2 \leq 0.17$$

H1(mm) indicating the height of the stepped portion of the second electrode, and H2(mm) indicating the height of the sidewall portion of the second electrode.

20. The electron gun of claim 15, wherein the second electrode is structured to satisfy the following condition:

$$0.05 \leq H1(mm) \leq 0.30$$

H1(mm) indicating the height of the stepped portion of the second electrode.